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Fintraffic Rail information systems and integration interfaces for railway undertakings

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1 Introduction

The opening of competition in railway traffic enables more railway undertakings than before to operate on the Finnish rail network. Railway undertakings include railway companies, track maintenance companies, and operators of museum traffic. In addition, other companies or organizations operating on the rail network, even if railway operation is not their main activity, are also considered railway undertakings.

Fintraffic Rail is responsible for railway traffic control and capacity management on the state-owned rail network, as well as for the information systems related to railway capacity management, traffic planning, and traffic control. The information systems managed by Fintraffic Rail have basic readiness for new railway undertakings to connect to Fintraffic Rail's services.

This document provides a general description of the Fintraffic information systems that railway undertakings must use when operating on Finland's state-owned rail network. In addition, the document describes the optional technical prerequisites that a railway undertaking may implement, if it wishes, in order to connect to Fintraffic Rail's information systems insofar as they are relevant to operation on the rail network. The document also provides a general description of the future target state of information systems related to Fintraffic Rail's operations.

Detailed message schemas can be found from the Fintraffic website at www.fintraffic.fi/en/railway-traffic.

All information described in this document is valid at the time of publication and may change. Up-to-date information, including message schemas, are available upon request at info@fintraffic.fi to verify that the information is current.

The Finnish Transport Infrastructure Agency's information systems and the related requirements for railway undertakings are described in a separate document produced by the Finnish Transport Infrastructure Agency.

2 Fintraffic Rail information systems mandatory for railway undertakings

This chapter briefly describes the Fintraffic Rail traffic and capacity management information systems that railway undertakings must use when operating on Finland's state-owned rail network.

Further information and user instructions for the KUPLA and LIIKE systems described below are available on Fintraffic's website at: https://www.fintraffic.fi/fi/raide/raideliikenteenpalvelut/tietojarjestelmatv

2.1 Capacity Management - LIIKE

The LIIKE capacity management system is used to manage urgent and regular rail capacity and to submit mandatory train composition data.

In the LIIKE system, the railway undertaking prepares timetable plans and applies for rail capacity for the plans it has created.

2.2 Driver's running information - KUPLA

The driver terminal application (KUPLA) is used to view the information required for driving a railway unit. With the KUPLA application, the train driver receives on the KUPLA terminal device timetable and advance notice information related to the route to be driven, as well as urgent notices issued as traffic control notifications.

The different mandatory backup procedures for the KUPLA system for railway undertakings are described in the Safety Rules for Train Traffic and Shunting Work (JT). The up-to-date instruction is available in the Finnish Transport Infrastructure Agency's instruction catalogue at https://ohjeluettelo.vayla.fi/. The backup procedures are also described in more detail in the KUPLA user instructions.

2.3 Yard capacity management - SAAGA

SAAGA is an information system used for yard capacity management, through which yard track reservations and capacity are managed.

2.4 Backup system for yard capacity management - Track Tool

The Track Tool is intended for managing the use of tracks at railway operating locations. For railway undertakings, the Track Tool is used as a backup system for yard capacity management when the SAAGA system is unavailable.

3 Fintraffic Rail optional information systems for railway undertakings

This chapter briefly describes the Fintraffic Rail traffic and capacity management information systems that a railway undertaking may use as optional information systems if it wishes.

3.1 Rolling stock fault alerts - VALTSU

VALTSU is a system that receives messages on train passings sent by monitoring devices on the Finnish rail network. VALTSU analyzes the received messages and generates alerts based on defined alerting rules. In the VALTSU system, the user can monitor passings in real time, individual monitoring devices, and historical data.

The information transmitted through the VALTSU system is also available to railway undertakings via the data sharing platform.

3.2 Track work situational picture - RUMA

The RUMA system contains annual plans for track work, advance notices, power interruptions, and other notices restricting the use of the rail network. The RUMA system is also used to manage the authorization of track work.

3.3 Train running and disruption information - KUTI

With the KUTI system, a railway undertaking can monitor actual train running data, forecasts, and cause recordings. The system also allows users to challenge entered cause recordings.

3.4 Real-time graphics for unit movements - Reaali++

The Reaali++ system presents planned, actual, and forecast train traffic timetables using a graphical timetable.

3.5 Rail traffic map view - YKÄ

The YKÄ system displays the locations of rail network track elements and railway units on a map.

4 File-based transfers

File-based transfer means transferring data or materials from one system to another as separate files.

File-based transfers serve as alternative means of loading information into a system instead of entering it directly into the system.

The file-based transfers that railway undertakings may use are described below at a high level. All file-based transfers described below are optional for railway undertakings.

4.1 Regular traffic rail capacity application data

Rail capacity applicants apply for regular rail traffic capacity for each annual timetable period through the Finnish Transport Infrastructure Agency.

The regular traffic plan, and attaching it to a regular rail capacity application, can be prepared using the Viriato railway timetable planning software instead of the LIIKE system. In this case, timetable applications are transferred to the LIIKE system as XML files using Viriato file transfer. Correspondingly, the granted capacity is received from the system as XML files.

4.2 Track information for regular traffic rail capacity applications

For passenger traffic, in addition to other mandatory information, the railway undertaking must provide the track information for commercial stops in the regular traffic rail capacity application for those stations that are not under Fintraffic Rail's planning responsibility.

The information is submitted as a simple CSV file, or it can be entered directly in the LIIKE system user interface.

4.3 Yard track reservation plan

Yard track reservations and capacity are managed in the SAAGA system. Alternatively, information on recurring track reservations can be submitted as a simple CSV file.

5 Integration interfaces

Fintraffic Rail produces and receives information related to railway traffic through the RIPA interface service for traffic control needs. Railway undertakings may use this information through an integration interface if they wish. Each railway undertaking is responsible for implementing the interfaces it wants to connect to Fintraffic Rail's information systems.

The information available at a high level through the integration interfaces, both from railway undertakings to Fintraffic Rail and from Fintraffic Rail to railway undertakings, is listed below.

5.1 Information transmitted from railway undertakings to Fintraffic Rail

- Urgent capacity application

  - Request for a new urgent capacity application through the integration instead of applying for the timetable through the LIIKE system user interface.

- Capacity cancellation
  - A railway undertaking’s notification that granted capacity will not be used and that the timetable is cancelled either in full or in part. This replaces the cancellation notice submitted through the LIIKE user interface.
- Train composition data
  - Information on the actual composition of the train, which must be submitted before the train’s departure. The composition is divided into sections where necessary if the train composition changes during the journey. The information includes the EVN numbers of all rolling stock units, their lengths, weights, and other basic data. The composition message also includes dangerous goods information if dangerous goods are transported in a freight train. This replaces the information entered through the LIIKE user interface.
- Yard track reservations and track change requests to the SAAGA system
  - Requests to the SAAGA system for new capacity and usage-need reservations for yard tracks or for changes to them. This replaces the corresponding functions performed through the SAAGA system user interface.

5.2 Information transmitted from Fintraffic Rail to railway undertakings

- Confirmed capacity and capacity changes
  - Information on the capacity granted to a train, including the train’s exact timetable. Timetable information is resent if the granted capacity is cancelled either in full or in part.
- Track changes

    - Information on a changed track at the train’s timetable location as part of the updated timetable message.

- Train actual data
    - Real-time information on the train’s arrival and departure time at a timetable location when the actual data has been generated in the system.
- Train forecasts
    - Information on the train’s forecast progress for the rest of its route. This includes both automatically generated forecasts as the train moves on the rail network and manual forecasts entered by traffic control when necessary.
- Train movement messages
    - Real-time information on track sections occupied and released by the train as it moves on the rail network. This enables the train’s location to be monitored at track-section level.
- Train route setting messages
    - Information on the routes set for the train, which also indicates, for example, the platform track used by a passenger train.
- Running information printout through the interface
    - A PDF-format running information printout available through the interface for operating the train.

6 Digitraffic.fi

Digitraffic.fi is a service owned by Fintraffic that provides event data through an open API. For railway traffic, the service provides event data such as train timetables, actual data, locations, and compositions. In addition, the service provides various metadata, such as a list of all railway operating locations. The main data source for the service is the LIIKE system.

However, railway undertakings are encouraged to primarily use the official information systems and interfaces described in this document when processing event data.

7 Future projects and systems

Railway traffic control systems and their interfaces are expected to change significantly within approximately the next 5–10 years. This chapter describes the future changes and system development programmes known at the time of publication of this document, which will have a significant impact on railway undertakings' interfaces.

7.1 Telematics TSI

ERA, the European Union Agency for Railways, has prepared guidance on the interoperability of railway traffic telematics as part of its objective to harmonize European railway traffic (*Telematics TSI, Telematics Technical Specifications for Interoperability*). As a result of this guidance, the information transmitted through integration interfaces must consist of messages compliant with Telematics TSI.

In the future, a large share of the information transmitted through Finland's railway traffic integration interfaces will also be exchanged using messages compliant with Telematics TSI.

More detailed Telematics TSI message information is available at https://gitlab.com/era-europa-eu/public/era-telematics-tsi/tsi_telematics

7.2 Sofia

Fintraffic Rail is developing a new Sofia system for train traffic and yard capacity management. The system will replace the current LIIKE and SAAGA information systems, as well as Viriato.

The Sofia system will be used both by railway undertakings applying for rail capacity and by Fintraffic Rail experts processing capacity. The system covers the application for and processing of both regular and urgent capacity, as well as reservations related to the use of yard tracks and management of yard track usage.

The objective is to deploy the first part of the Sofia system by the end of 2027.

7.3 ATLAS

Fintraffic Rail is developing a new railway traffic control and management system called ATLAS. ATLAS is a TMS system (Traffic Management System) that will cover both train operation control (current remote control) and the

current traffic management function. The system will be built in phases, with the objective of replacing the current traffic management systems with the ATLAS system over the next 5–7 years. As a result of the change, traffic management interfaces will also be renewed, but at the time of publication of this document, no more detailed information is yet available on future interface changes.